



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/780,183

02/17/2004

Arthur Kenneth Hochberg

06417 USA

1740

23543

7590

11/02/2005

AIR PRODUCTS AND CHEMICALS, INC.
PATENT DEPARTMENT
7201 HAMILTON BOULEVARD
ALLENTOWN, PA 181951501

EXAMINER

RAO, SHRINIVAS H

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/780,183

Applicant(s)

HOCHBERG ET AL.

Examiner

Steven H. Rao

Art Unit

2814

AM

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 12-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

Applicants' amendment filed on August 18, 2005 has been entered and forwarded to the Examiner on August 24, 2005.

Therefore claims 1 to 11 as recited in the amendment are currently pending in the Application.

Claims 12 –16 are withdrawn from consideration after election.

Election/Restrictions

Claims 12-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Groups II and III , there being no allowable generic or linking claim.

Applicant timely traversed the restriction (election) requirement in the reply filed on August 24, 2005.

Applicants' request for reinstatement of at least Gr. II because " a process for the chemical vapor deposition of a silicon containing film" and " a process for forming a silicon-containing film " reside in class 438 and therefore there would be no serious burden on the Office is not persuasive .

Firstly the standard applied by the Applicants' and their Attorneys is wrong. The standard is not that because there are a few overlapping areas e.g. 438 the burden on the Office is less.

Applicants' analysis fails to recognize that search for group II CVD will also include a search in classes 427 and 430 which is not necessary for group I, thus the patent Office will be greatly unduly burdened by the rejoinder as requested.

Art Unit: 2814

Therefore the restriction/election requirement in to three groups is made Final.

Information Disclosure Statement

No further IDS after the one filed on February 17, 2004 has been file din this case.

Claim Rejections - 35 USC Section 1 03

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 to 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over No. 5,763,021, herein after Young) in view of Hirooka et al. (Young et al. (U.S. Patent U.S. Patent No. 5,645,947 herein after Hirooka). (The previous rejection has been reproduced below for ready reference – for response to Applicants' arguments –see section below).

With respect to claim 1 Young describes a process for forming a silicon- containing film, the process comprising : introducing a substrate (Young col. 2 lines 60-65) and gaseous reagents comprising an iodosilane precursor having three or less iodine atoms

Art Unit: 2814

bound to the silicon atom (Young col. 4 line 17) and at least one reagent selected from an oxygen-containing reactive gas, a nitrogen- containing reactive gas, a hydrogen-containing reactive gas, a silicon-containing precursor, and mixtures thereof (col. 2 lines 19-25) into a reaction chamber, (Young col. 5 line 23).

Young does not specifically describe heating the reaction chamber to one or more temperatures ranging from 200 C to 900C to form the silicon containing film on the substrate provided that if the iodosilane precursor has three iodine atoms bound to the silicon atom then the heating step is conducted at one or more pressures less than 600 Torr.

However Hirooka, patent from the same filed of endeavor describes in Examples 1-17 etc. heating the reaction chamber to one or more temperatures ranging from 200 C to 900C to form the silicon containing film on the substrate provided that if the iodosilane precursor has three iodine atoms bound to the silicon atom then the heating step is conducted at one or more pressures less than 600 Torr to form more stable production of deposited film by controlling the temperature .

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Hirooka's heating the reaction chamber to one or more temperatures ranging from 200 C to 900C to form the silicon containing film on the substrate provided that if the iodosilane precursor has three iodine atoms bound to the silicon atom then the heating step is conducted at one or more pressures less than 600 Torr. (Hirooka e.g. examples -1-5 Torr) to form more stable production of deposited film by controlling the temperature . (Hirooka col. 4 lines 5-10).

Art Unit: 2814

With respect to claim 2 Young describes the process of claim 1 wherein the iodosilane precursor is a compound of the formula $\text{It}_{(4-n)}\text{SiH}_n$, where $n=1,2$ or 3 . (Hirooka col. 4 lines 30 to 55).

With respect to claim 3 Young describes the process of claim 1 wherein the at least one reagent comprises the nitrogen-containing reactive gas. (Hirooka

With respect to claims 4 Young describes the process of claim 3 wherein the nitrogen-containing reactive gas is selected from ammonia, hydrazine, and mixtures thereof (Hirooka Col.6 lines 25-35).

With respect to claim 5 Young describes the process of claim 4 wherein the nitrogen-containing reactive gas is ammonia. (Hirooka Col.6 lines 25-35)

With respect to claim 6 Young describes the process of claim 5 wherein the molar ratio of ammonia to the iodosilane precursor is at least 0.2:1. (Hirooka col. 5 lines

8-10, etc.)

With respect to claim 7 describes the process of claim 3 wherein the at least one reagent comprises the oxygen-containing reactive gas. (Hirooka col. 6 line 32).

With respect to claim 8 describes the process of claim 7 wherein the oxygen-containing reactive gas is at least one selected from O_2 , O_a , NaO , NO_2 , and mixtures thereof. (Hirooka col. 6 line 32)

With respect to claim 9 describes the process of claim 1 wherein the at least one reagent comprises the oxygen-containing reactive gas. (Hirooka col. 6 line 32).

With respect to claim 10 describes the process of claim 1 wherein the heating is

Art Unit: 2814

conducted at one or more pressures ranging from 10 mTorr to 20 Torr.t Hirooka examples 0.8-1.00 Torr).

With respect to claim 11 , Young describes the semiconductor substrate comprising the silicon containing film produced by the process of claim 1. (Young abs. Line 2, Hirooka abs. Line I).

Response to Arguments

Applicant's arguments filed August 24, 2005 have been fully considered but they are not persuasive for the following reasons :

Applicants' contention that the applied primary Young reference 's teaching be limited to plasma CVD and contention that the applied secondary reference Hirooka reference allegedly prefers CVD without plasma and therefore the two applied references cannot be combined is not persuasive because Applicants' are misreading the Hirooka reference it would be very clearly seem by one of ordinary skill in the art that Hirooka reference merely states that plasma gas is not introduced in space/chamber A , but plasma precursors are separately formed in space/chamber B and/or C separately and the "plasmaed precursor and the other gases are feed into chamber A instead of generating the plasma gas in chamber A itself. Therefore Applicants' blanket conclusion that Hirooka teaches away from plasma CVD is not consistent with the teachings of Hirooka wherein the plams is separately generated and then feed in to the chamber A.

Therefore Young and Hirooka can be combined and their teachings are consistent with each other .

Art Unit: 2814

In fact Hirooka states " THE CONVETIONAL PLASMA CVD PROCESS IS REGARDED AT THE PRESENT TIME AS THE BEST METHOD FOR THE PURPOSE OF OBTAINING AMORPHOUS SILICON FILM WHICH HAVE SUCH ELCTRICAL AND OPTICAL PROPERTIES AS TO FULFILL VARIOUS APPLICATION PURPOSES." (col. 1 lines 55 to 60)

Therefore all of applicants' arguments are not persuasive and the rejection made Final.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (571) 272-1718. The examiner can normally be reached on 8.00 to 5.00.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SL
10/28/05

LONG/HAN
PRIMARY EXAM...